June 12, 2003 Our ref: 023-2002.0007

Crown Resources
4251 Kipling St. #390
Wheat Ridge, CO 80033

ATTENTION: Mr. Walt Hunt

RE: REPORT FOR GEOPHYSICAL SURVEY IN SUPPORT OF BUCKHORN MOUNTAIN PROJECT

Dear Mr. Hunt:

This letter summarizes the results from the recent geophysical investigation conducted by Golder Associates, Inc. at Buckhorn Mountain for Crown Resources. The objective of this survey was to use seismic refraction and electrical resistivity imaging (ERI) to determine depth to top of bedrock and the water table in support of construction of a proposed tailings pond facility.

METHODOLOGY

Seismic Refraction

The seismic refraction method is used to determine the compressional velocity of soil and rock material. The calculated velocity information is used to assist in identifying material type (sediment, till, bedrock etc.), estimating rippability characteristics, and to model a depth profile of the subsurface geology.

The typical energy source used for generating a seismic signal is either chemical explosives or a weight drop. As the generated seismic wave propagates through the earth it is refracted (changes direction) due to an increase in the compressional velocity of the subsurface material. When the seismic wave impinges on an interface at a critical incident angle, the energy travels along the interface generating seismic wavelets that are then refracted to the ground surface. Geophones placed at selected intervals along the ground surface detect the refracted arrivals and produce an electrical signal that is recorded on a seismograph. The seismograph digitizes, amplifies, filters and records the incoming signals. The seismograph also produces a paper record that shows the seismic wavelet received by each geophone.

On the seismic record the travel time of the first arrival of the refracted data is identified and measured for each of the 24 channels. Seismic processing and modeling software is then used to convert the first arrival travel time data to compressional velocities and depth to the various interfaces.

The data at this site were collected using a Geometrics 24-channel Strataview seismograph. A shot gun source with black powder and unloaded shells was used as the energy source.

Electrical Resistivity Imaging

The ERI method maps differences in the electrical properties of subsurface materials. These differences can result from variations in sediment or rock type, changes in water content, pore-water chemistry, and the presence of buried debris. The method involves transmitting an electric current into the ground between two current electrodes and measuring the voltage between two potential electrodes. The measured point, called a sounding, is the apparent resistance of the area, to some depth, beneath the electrodes. Deeper soundings are made by increasing the electrode spacing about a point and a profile of the subsurface is developed by moving the electrodes along a transect at a fixed spacing.

The ERI imaging system uses a multiple electrode array under the control of a digital acquisition system to collect apparent resistivity values. The system records the potential values between multiple pairs of electrodes along the array. After each measurement the system automatically changes electrode spacing and combinations which eventually generate an apparent resistivity profile along the entire alignment or transect.

Using inversion software, a 2-D resistivity cross-section is created using the apparent resistivity values. This cross-section is presented as a color image that highlights geologic or other features (presence of contaminants, groundwater, voids, etc.) that represent variations in resistivity with depth and along the transect.

The data were collected using an Iris Syscal R1 Earth Resistivity Meter, multi-electrode data acquisition system consisting of 72 electrodes. The electrodes were configured as either Wenner-Schlumberger or a dipole-dipole.

FIELD PROCEDURE

Seismic refraction and ERI data were collected at Dry Gulch and Lost Creek. The following summarizes the geophysical coverage at each site.

At Dry Gulch, geophysical data were collected along three transects (Figure 1). For Line 1, ERI data were collected along approximately half the line and seismic refraction data were collected along the entire line. The ERI data were collected using a Wenner-Schlumberger array with a 16 foot electrode spacing. The seismic refraction data were collected along four spreads of 24 geophones on each spread using a 20 foot geophone spacing. For Line 2, seismic refraction data were collected along four spreads of 24 geophones using a 20 foot geophone spacing. For Line 3, ERI data were collected using a dipole-dipole array with a 10 foot electrode spacing.

At Lost Creek, geophysical data were collected along 1 transect (Figure 2). Seismic data were collected along three spreads of 24 geophones with a 16 foot geophone spacing. ERI data were collected using a Wenner-Schlumberger array with a 16 foot electrode spacing.

RESULTS

Dry Gulch

Based on information provided by Crown Resources, the geology at Dry Gulch consists of colluvium with clay lenses over laying bedrock. Geophysical data were collected along three transects at Dry Gulch (Figure 1).

The objective of the seismic refraction and ERI data collected on Line 1 (Figure 3) was to estimate the depth to the top of bedrock and the water table, and to locate possible clay lenses within the colluvium. Unfortunately, the apparent high conductivity of the ground water prevented imaging the underlying bedrock with the ERI data. It is also possible that the bedrock could not be imaged because of water filled fractures, which would produce a poor electrical contrast with the overlying colluvium. The interpreted ERI data shows the top of the water table, which ranges from 30 to 140 feet below ground surface, and an interpreted clay lenses within the colluvium.

The interpreted seismic data shows the top of bedrock along Line 1. The bedrock velocity was calculated to be approximately 11,000 feet per second. The interpreted depth to top of bedrock ranges from 65 to 195 feet below ground surface. The interpreted depth to the top of bedrock and the water table are approximately equal from Station 2+60 to 7+20. From Station 7+20 to 8+90, the interpreted depth to the top of the water table is approximately 50 feet less than the interpreted depth to the top of bedrock. This difference may indicate the presence of a clay barrier overlying the bedrock. From Station 8+90 to 14+40, the interpreted depth to the top of the water table is approximately 25 feet shallower than the interpreted depth to the top of bedrock.

The objective of the seismic refraction data collected on Line 2 (Figure 4) was to estimate the thickness of the colluvium for determining the feasibility and planning an excavation program. The interpreted depth to the top of bedrock is approximately 150 feet below ground surface. Near the center of the line the bedrock was not imaged and is believed to be deeper than 175 feet below ground surface. The velocity of the bedrock was calculated to be approximately 11,000 feet per second.

The objective of the ERI data collected on Line 3 (Figure 5) was to estimate the depth to the top of the water table. The interpreted depth to the top of the water table ranges from 10 to 50 feet below ground surface. There are also three interpreted clay lenses within the colluvium.

Lost Creek

From information provided by Crown Resources, the geology at Lost Creek is alluvium over laying bedrock. Geophysical data were collected along one transect at Lost Creek (Figure 2).

The objective of the seismic refraction and ERI data collected at Lost Creek (Figure 6) was to estimate the depth to the top of bedrock and the water table. The interpreted ERI data shows the top of the water table between Stations 6+10 to 11+50. From Station 1+90 to 6+10, the ERI data was adversely effected by an irrigation system located perpendicular to the transect at Station 2+80. From Station 6+10 to 11+50 the interpreted depth of the top of the water table ranged from 35 to 50 feet below ground surface.

The calculated velocity of the bedrock is approximately 12,000 feet/second and the interpreted depth to the top of bedrock ranges from 30 to 125 feet below ground surface.

LIMITATIONS OF GEOPHYSICS

Golder's services are conducted in a manner consistent with that level of care and skill ordinarily exercised by other members of the geophysical community currently practicing under similar conditions subject to the time limits, and financial and physical constraints applicable to the services. The geophysical methods presented here are remote sensing methods that may not detect all targets and interfaces of interest. It is also possible that the geophysical data may reveal subsurface targets that, without intrusive sampling, may be misinterpreted as a target of interest or be located at a depth greater or less than the depth shown on the interpreted figures and drawings.

We appreciate the opportunity to work with you on this project. Please contact us if you require additional information, (425) 883-0777.

Sincerely,

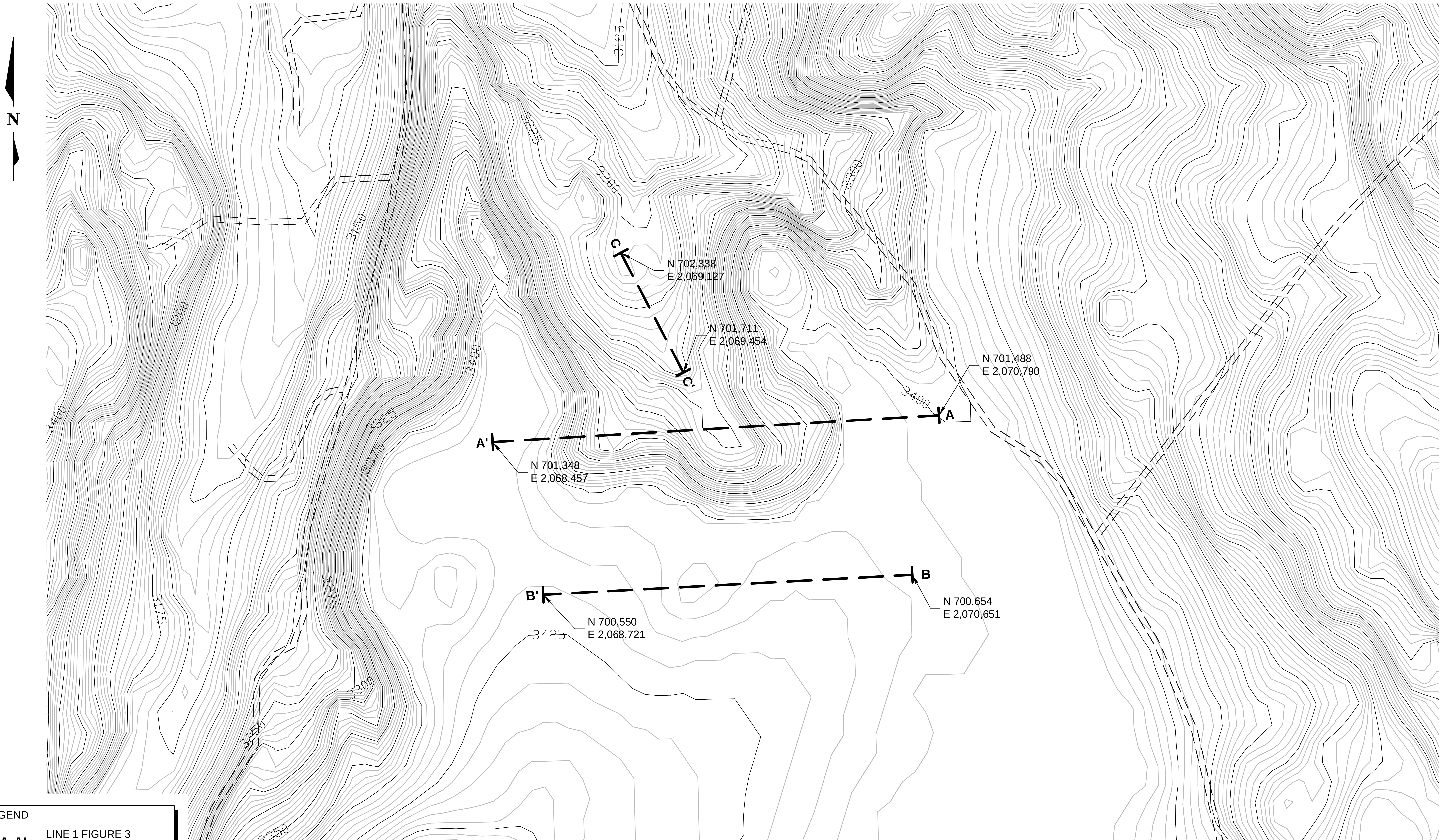
GOLDER ASSOCIATES INC.

Shane Hickman
Staff Geophysicist

Dick Sylwester
Associate

SMH/RES/tp

FIGURES



LEGEND

A-A'	LINE 1 FIGURE 3 REFRACTION AND ERI
B-B'	LINE 2 FIGURE 4 REFRACTION ONLY
C-C'	LINE 3 FIGURE 5 ERI ONLY

FIGURE 1

SEISMIC REFRACTION AND ERI TRANSECT LOCATIONS AT DRY GULCH

CROWN/PLAN OF OPERATIONS/WA

Golder Associates

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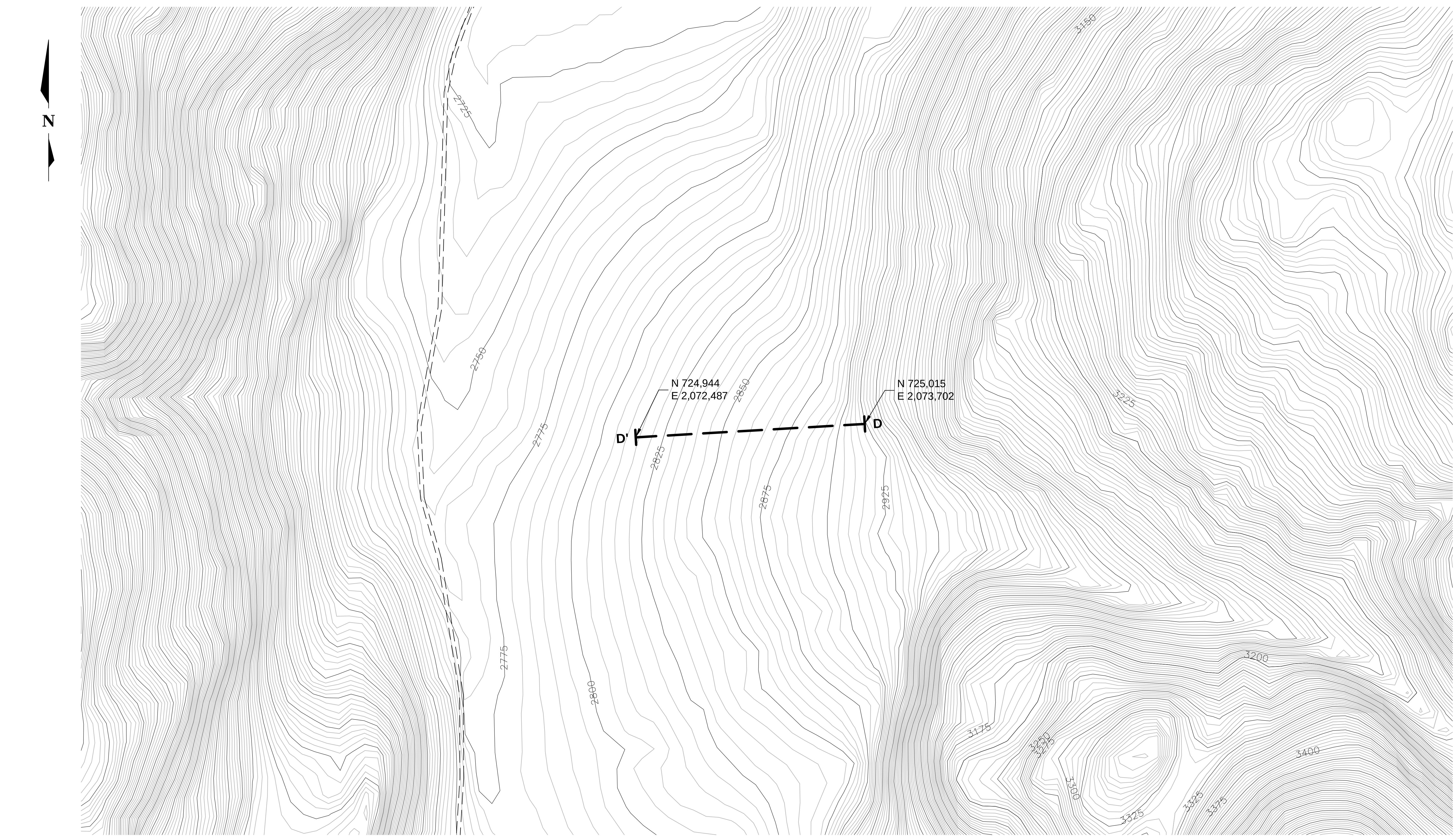

LEGEND

D-D' LINE 4 FIGURE 6 REFRACTION AND ERI

FIGURE 2

SEISMIC REFRACTION AND ERI TRANSECT LOCATION AT LOST CREEK

CROWN/PLAN OF OPERATIONS/WA

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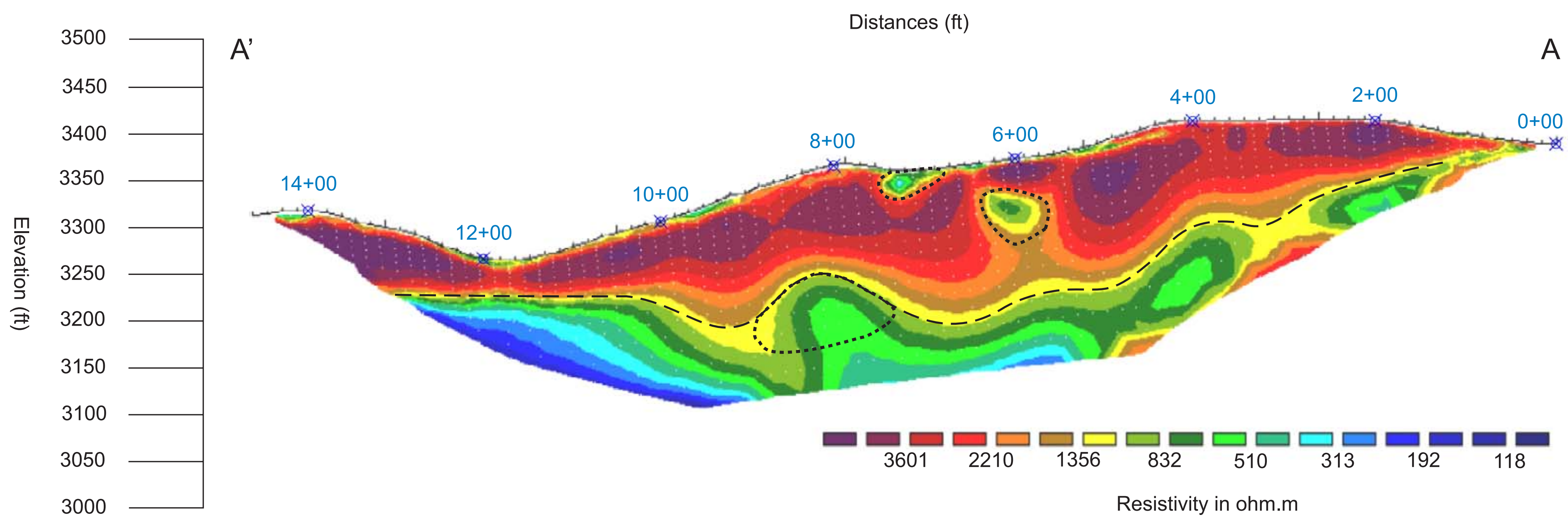


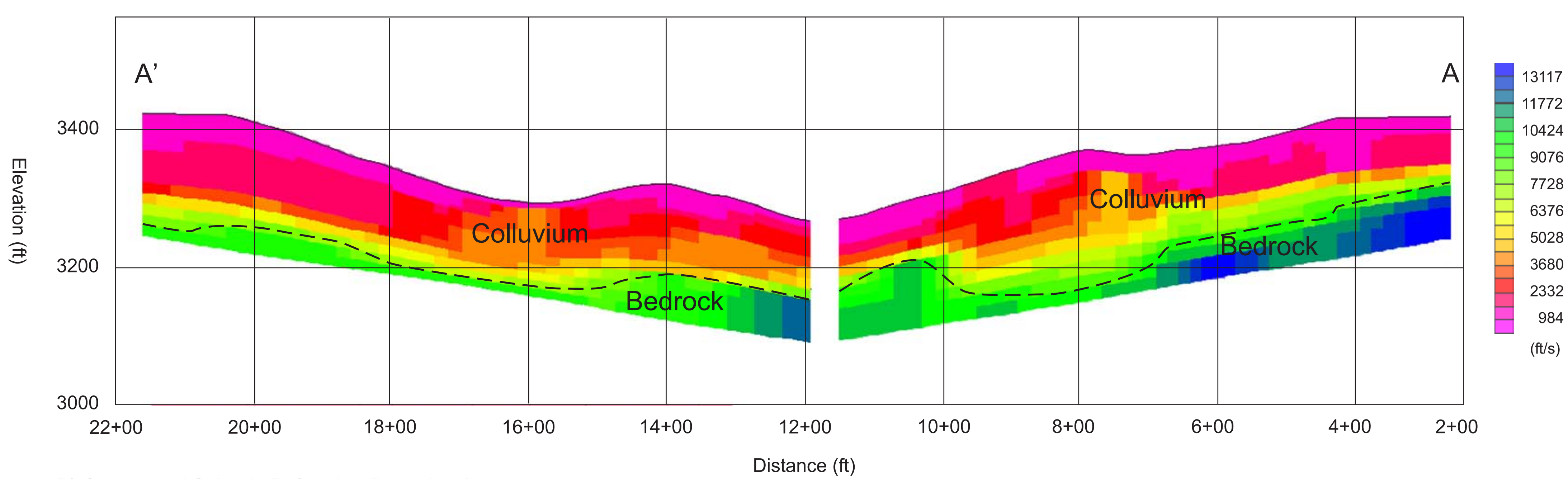
A) Interpreted ERI Data Line 1

LEGEND

– – – Interpreted Top of Water Table

Interpreted Clay Lense

See Figure 1 for Location



B) Interpreted Seismic Refraction Data Line 1

LEGEND

– – – Interpreted Top of Bedrock

See Figure 1 for Location

FIGURE 3

INTERPRETED ERI REFRACTION AND SEISMIC DATA COLLECTED ALONG LINE (A - A') AT DRY GULCH

CROWN/PLAN OF OPERATION/WA

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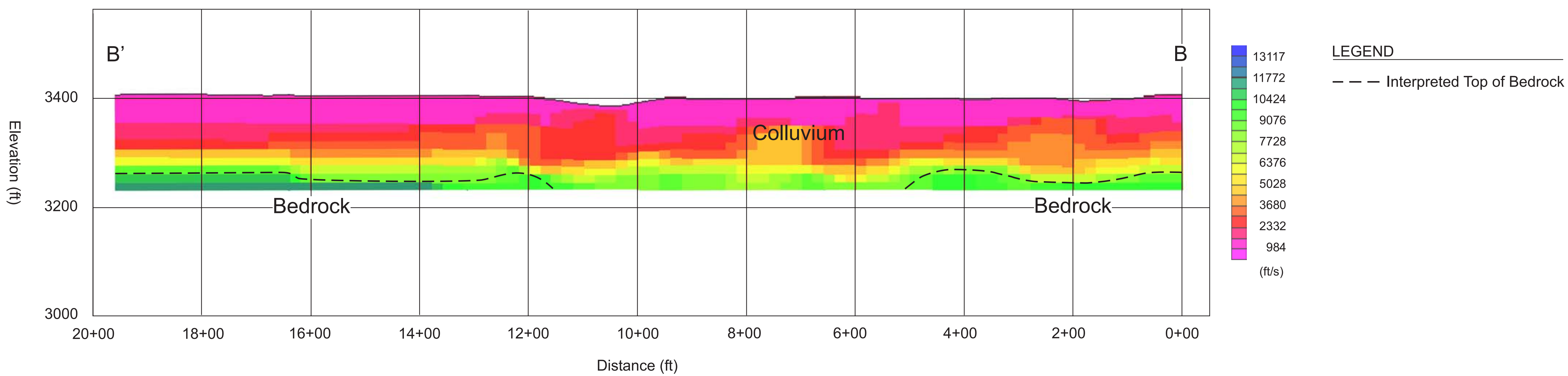

FIGURE 4

INTERPRETED SEISMIC REFRACTION DATA COLLECTED ALONG LINE 2 (B - B') AT DRY GULCH

CROWN/PLAN OF OPERATION/WA

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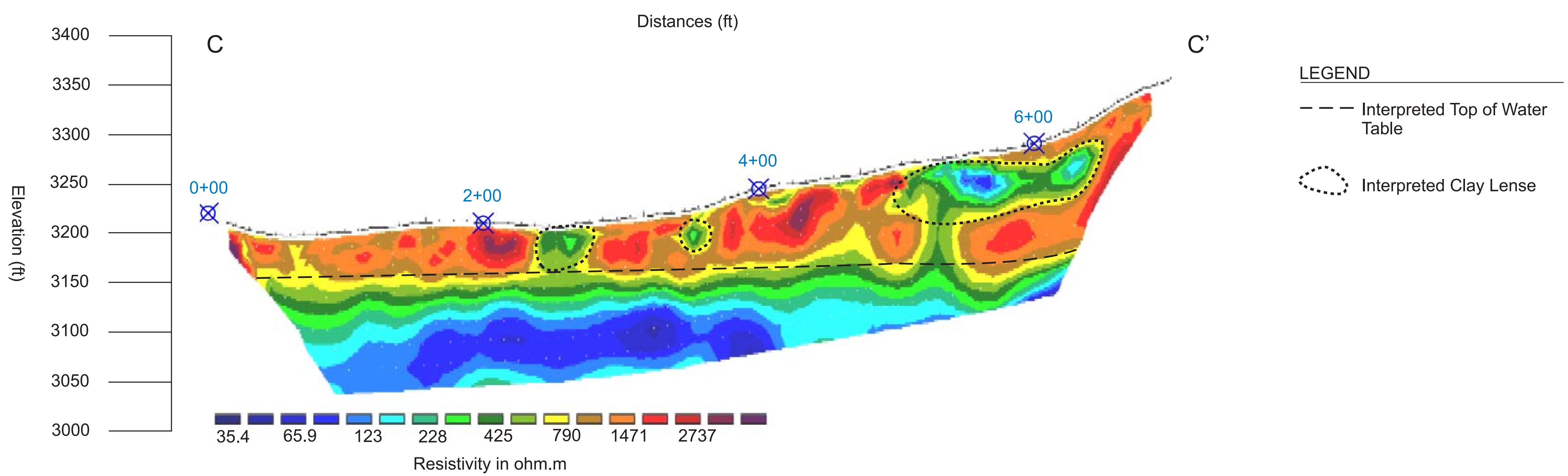

FIGURE 5
INTERPRETED ERI DATA COLLECTED ALONG LINE 3 (C - C') AT DRY GULCH
CROWN/PLAN OF OPERATION/WA

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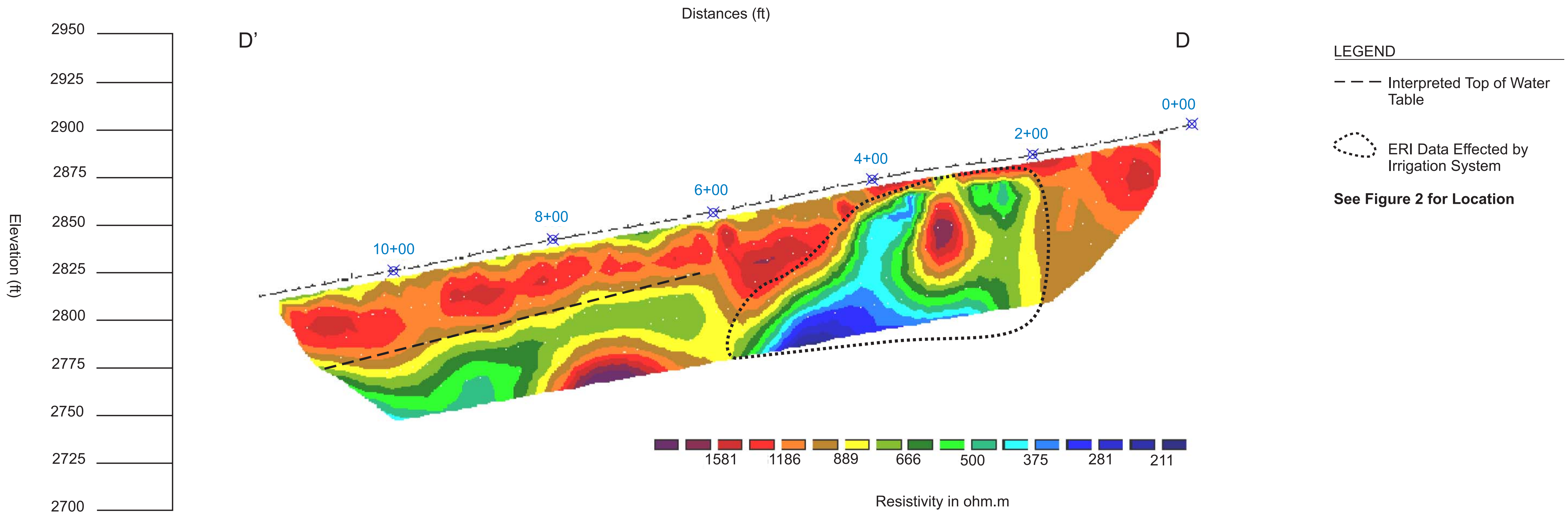
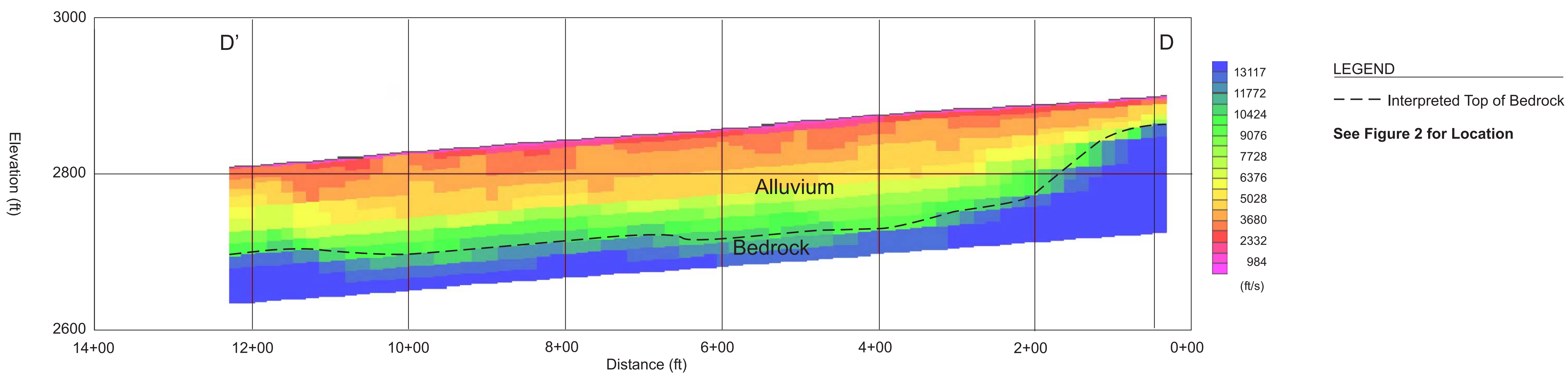


A) Interpreted ERI Data



B) Interpreted Seismic Refraction Data

FIGURE 6

INTERPRETED ERI REFRACTION AND SEISMIC DATA COLLECTED ALONG LINE 4 (D - D') AT LOST CREEK

CROWN/PLAN OF OPERATION/WA

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